TECHNICAL MEMORANDUM

Date: June 22, 2007
To: John Moore, P.E., City of Waukegan
From: Robert Solak, P.E.
cc: T. Harrington, Harrington Engineering & Construction
G. Deigan, Deigan & Associates
RE: Waukegan Harbor Slip 3 – Field Sampling Results

This memorandum presents the data collected from the field sampling conducted at the OMC Superfund Site in Waukegan, Illinois. The sampling was conducted in support of the Slip 3 Containment Alteration design, to be prepared by Harrington Engineering and Construction, LLC (HEC).

The objectives of the investigative sampling were:

1. To provide data on the extent of PCB's in the overlaying surcharge sand,
2. To determine if surcharge sand can be visually distinguished from underlying sediment, and
3. To provide geotechnical information for design of foundations for a dry-rack storage building to be located on the Slip No. 3 Containment Cell.

The investigative sampling found that the surcharge sand is visually distinguishable from the underlying sediment. However, the PCBs sample results indicate that separation of the different materials may not be necessary during the alteration work. Analysis of the geotechnical data gathered has shown that a piling foundation, instead of conventionally spread footings, will be required for the proposed boat storage facility.

Background

The Slip No. 3 Containment Cell was created and filled with PCB-containing sediments in 1991 and 1992. Two rows of sheet pile were installed across the mouth of Slip No. 3, with the space between filled with a sand-bentonite mix, to isolate the cell from Lake Michigan. An impermeable soil-bentonite cut off wall was installed 20-40 feet behind the existing Slip No. 3 sheet pile walls and tied into the sand-bentonite mix in the double sheet pile wall along the mouth to isolate the cell from local groundwater. The former slip area was then filled with dredged sediments to an elevation of approximately 3 feet below natural grade.

Sand was placed over the dredged sediments to surcharge load the sediment, accelerating the settlement of the sediments. After two years of settling, the surcharge sand was graded for drainage (2% slope on the top of the cap) and a 60-mil high-density polyethylene (HDPE) liner was placed over the surcharge sand. The HDPE liner was

overlaid with a geogrid drain layer, geotextile filter fabric, 18 inches of sand, and 6 inches of topsoil. A dewatering system was also installed to maintain groundwater elevation inside the Slip No. 3 Containment Cell lower than the surrounding groundwater. The final elevation of the containment cell cover was approximately 5 feet above the surrounding land, at its highest point.

The City seeks to return the land area above the Slip No. 3 Containment Cell to beneficial use by the neighboring marina (Larsen Marine Services) for indoor/outdoor boat storage. To effect this usage, removal of portions of the surcharge sand, beneath the liner, will be required, as well as the construction of building foundations. The details of this alteration are to be provided in design drawings, currently in preparation.

A Field Sampling Plan (FSP), dated May 2006, was prepared by HEC to aid in design of the alteration of the containment cell. The plan called for eight (8) borings to be advanced, recovered, and sampled for PCBs at various depth intervals using direct-push methods. A maximum of 40 environmental samples (5 per boring) were anticipated. The borings were to be advanced to a depth of approximately 10 feet below the HDPE liner. The plan also called for two (2) borings to be advanced for the collection of geotechnical data using hollow stem auger and split spoon methods. These borings were to proceed to the Chicago hardpan (approximately 25-35 feet below ground surface).

Schedule

The field sampling was conducted on March 6 and 7, 2007. Repair of the liner at the boring locations was completed May 14 through 16, 2007.

Personnel

The following personnel were involved in the field sampling effort.

Name	Affiliation	Purpose
Bob Solak	HEC	Project Engineer / Task Manager
Gary Deigan	Deigan & Associates, LLC	Project Manager / Coordinator for City of Waukegan
Kerry Van Allen	Deigan & Associates, LLC	Project Geologist
John Noyes, P.G.	Cabeno Environmental	Cone Penetrometer Operator
Drill Crew (2)	Cabeno Environmental	Geoprobe™ Operators
Liner Repair Crew (3)	Independent Environmental Services	Liner repair

Field Sampling Methods

Two changes to the FSP were initiated prior to the field sampling effort. First, due to frozen soil conditions, it was decided not to excavate down to the liner and cut it by hand prior to advancing the soil borings. Rather, the Geoprobe™ was advanced through the cover soils and the HDPE liner to obtain samples of underlying soil and sediment. Second, rather than collect geotechnical data using hollow-stem auger and split spoon, it was decided to use cone penetrometer soundings to collect some of the desired data.

Environmental Sampling
Eight borings for environmental sample collection were advanced using a 6610DT tracked Geoprobe™ rig, equipped with a 3-inch diameter split spoon sampler using disposable acetate sleeves. Soil cores were continuously collected and logged by the Project Geologist. The borings were designated SB-101 through SB-108. Boring locations are shown on Figure 1. Boring logs are presented in Attachment A.

Between four and five soil samples were collected from each boring, depending upon the total depth of the boring and the amount of recovery from each split spoon interval. Soil from the designated sample interval was well mixed in a stainless steel bowl and 4 oz. of the mixed soil were placed into laboratory-supplied glass jars. A total of thirty-six (36) samples were submitted for PCB and percent moisture analysis. The samples were cooled to 4 deg. C and submitted for analysis by Severn Trent Laboratories, Inc. (STL) of University Park, Illinois. Analytical reports are provided in Attachment D.

The stainless steel drive points on the split spoon as well as the mixing bowl and utensils were decontaminated between the collection of each sample as specified in the FSP. Sampling personnel donned disposable gloves prior to the collection of each sample. All boreholes were filled with bentonite pellets to prevent vertical migration of precipitation into the containment cell, until the HDPE cover repair was completed in May 2007 (see Liner Repair description, below).

Geotechnical Sampling
Three soundings, to collect geotechnical data, were advanced using a 6610DT tracked Geoprobe™ rig, equipped with cone penetrometer (CPT) sounding equipment. The CPT test methods employed conformed to ASTM D 5778-97, "Standard Test Method for Performing Electronic Friction and Piezocone Testing of Soils". The CPT consisted of a steel cone on the end of a series of rods that were pushed into the ground at a constant rate of 2 centimeters per second, while continuous measurements were made electronically. Data was translated into tip to sleeve ratios and blow counts. The CPT also provided real-time output of soil lithology information. CPT soundings are provided in Attachment B.

Split-spoon, direct-push borings were also advanced within 5 feet of the CPT location in order to collect soil samples for geotechnical testing. Two intervals of soil were sampled from each CPT location and analyzed by STL for particle size (by ASTM D422) and percent solids. Results are provided in Attachment D. Six samples each were collected from borings GB-01 and GB-02 and two samples were collected from GB-03 and analyzed by STL for moisture content. Results are provided on Table 1. Boring logs for the three geotechnical borings are provided in Attachment A.

One sounding (designated on Figure 1 as GB-03A) was refused at a depth of approximately 7.5 feet below ground surface and abandoned (data not collected). The sounding was relocated (designated as GB-03B on Figure 1) and refused again. A corresponding split spoon, however, was successfully advanced at the GB-03B location.

All analytical results identified as GB-03 refer to location GB-03B. All boreholes were filled with bentonite pellets to prevent vertical migration of precipitation into the containment cell until the HDPE cover could be repaired.

Data Validation

Laboratory precision was evaluated by calculating the relative percent difference for sample duplicates. The table below presents those calculations

Sample ID	Parameter	Units	Duplicate	Sample	RPD (%)
SB-101, 10-12'	PCB-1248	ug/kg	3300	3700	11.4%
	% Moisture	%	7.1	5.4	27.2%
SB-102, 7-8.2'	PCB-1248	ug/kg	5500	9700	55.3%
	% Moisture	%	13	9.4	32.1%
SB-104, 2.5-4'	PCB-1248	ug/kg	1400	2000	35.3%
	% Moisture	%	4.1	4	2.5%
SB-106, 5-7'	PCB-1248	ug/kg	420	470	11.2%
	% Moisture	%	5.1	3.6	34.5%

The relative percent differences between the duplicates and the samples indicated minor precision issues. It is unknown if the differences are related to laboratory methods/equipment, sample matrix heterogeneity, or incomplete mixing of the sample interval prior to sample and duplicate collection. Given that the data was primarily being used to determine vertical and spatial variability in the containment cell, the precision of the data set is believed to be adequate.

No PCBs were detected above the reporting limit in any of the field or method blanks. All samples were analyzed within the method-required holding times. Analytical accuracy was evaluated by reviewing surrogate spikes and laboratory blanks. All surrogate and laboratory control spike recoveries were within the acceptable ranges.

Liner Repair

Following the sampling event and the thaw of the site cover soil, a liner repair crew was mobilized to the site. The crew excavated each boring location down to the geocomposite drainage layer, cut it away, and exposed the penetration of the HDPE cover layer. A patch of HDPE material was cut to size and the existing liner was cleaned and lightly abraded in the areas to receive the patch. The patch and the cover area were heated to adhere the patch to the cover, and then the patch was extrusion welded to the cover. Once cooled, the patch welds were vac-boxed tested for leaks and, if none were found, the geocomposite drain layer was zip-tied back into place over the patch. The excavation was then backfilled. One patch failed vac-box testing, was repaired, and re-tested successfully.

A total of 12 locations (eight soil borings, three geotechnical borings, and one refused boring) were repaired. The CPT locations required repairs of 5 punctures each (The CPT puncture, the corresponding split spoon puncture, and three helical anchor punctures required for the CPT).

Investigative-derived wastes

All waste derived from the sampling activities, including PPE, soil material, acetate sleeves, decontamination fluids, etc., were placed into two 55-gallon drums and labeled with "non-hazardous" waste and "PCB-containing" stickers, in accordance with the FSP. The drums were moved by and stored under the custody of the City of Waukegan in a locked storage area at the former OMC building. Photographs of the drums are included in Attachment C.

Sampling Results and Conclusions

PCB soil sample results are presented in Table 1 and Figure 1. The STL analytical reports are included in Attachment D.

Reported concentrations from all samples ranged from 250 to 45,000 ug/kg total PCB. Samples collected from boring intervals above 581.0' mean sea level (the lowest expected excavation depth during cell alteration) ranged from 470 to 26,000 ug/kg. In general, reported PCB concentrations were lower in samples from the presumed surcharge material than in the underlying sediment, however this was not always the case (refer to results for SB-101 and SB-106). Since all samples were below the 50 mg/kg level, however, the need to differentiate between these two material types during the Slip 3 alteration will not be critical. No horizontal trends in PCB concentrations could be inferred from the data.

Soil lithology observations, as noted on the boring logs in Attachment A, indicated a visible difference between the sediment and the surcharge sand in the containment cell. The surcharge sand was described as a brown/gray fine sand. Black-colored fine sand, silt, and clay generally marked the transition to the sediment layer. The surcharge layer was found to be typically between 2 and 4 feet thick, however, there were some exceptions of apparently thicker layers (SB-103, -107, and –108 and GB-03) and one thinner (GB-02).

In summary, PCB concentrations in both the sediment and surcharge layers were below 50 mg/kg at the locations sampled. A visible difference between the surcharge sand and the sediment was noted, and thus, separation of the layers during excavation would be feasible. However, due to the relatively low PCB concentrations, the need to separately handle these two layers may not be critical during alteration of the containment cell. Additionally, geotechnical data gathered during the field sampling effort have indicated that a piling foundation system is appropriate for the planned building construction at this site.

Table 1	Sampling Summary
Figure 1	PCB Sampling Results
Attachment A	Soil Boring Logs
Attachment B	Cone Penetrometer Soundings
Attachment C	Photographic Log
Attachment D	STL Analytical Reports

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Table 1
Field Sampling Results
Slip 3 Alteration - Waukegan Harbor
Waukegan, Illinois

Sample Name	Location	Elevation (MSL)	Top of Interval (ft bgs)	Bottom of Interval (ft bgs)	Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)	% Moisture
SB-101,2.5-3.8'	SB-101	588.8	2.5	3.8	586.3	585.0	16,000	3.3
SB-101,5-7'	SB-101	588.8	5.0	7.0	583.8	581.8	25,000	5.2
SB-101,7-9'	SB-101	588.8	7.0	9.0	581.8	579.8	5,800	6.4
SB-101,10-12'	SB-101	588.8	10.0	12.0	578.8	576.8	3,700	5.4
SB-101,12-13.1'	SB-101	588.8	12.0	13.1	576.8	575.7	5,300	4.6
SB-102,2.4-3.9'	SB-102	588.2	2.4	3.9	585.8	584.3	1,200	3.1
SB-102,5-7'	SB-102	588.2	5.0	7.0	583.2	581.2	16,000	11.0
SB-102,7-8.2'	SB-102	588.2	7.0	8.2	581.2	580.0	9,700	9.4
SB-102,10-11.3'	SB-102	588.2	10.0	11.3	578.2	576.9	21,000	5.2
SB-103,2.4-3.9'	SB-103	587.7	2.4	3.9	585.3	583.8	530	2.3
SB-103,5-7'	SB-103	587.7	5.0	7.0	582.7	580.7	1,700	5.2
SB-103,8-9.9'	SB-103	587.7	8.0	9.9	579.7	577.8	900	6.3
SB-103,10-12'	SB-103	587.7	10.0	12.0	577.7	575.7	860	6.4
SB-104,2.5-4'	SB-104	588.0	2.5	4.0	585.5	584.0	2,000	4.0
SB-104,5-7'	SB-104	588.0	5.0	7.0	583.0	581.0	5,100	3.5
SB-104,7-8.3'	SB-104	588.0	7.0	8.3	581.0	579.7	26,000	6.5
SB-104,10-11.5'	SB-104	588.0	10.0	11.5	578.0	576.5	4,500	7.4
SB-105,2.2-3.7'	SB-105	587.9	2.2	3.7	585.7	584.2	9,700	3.3
SB-105,5-7'	SB-105	587.9	5.0	7.0	582.9	580.9	2,100	6.1
SB-105,7-8'	SB-105	587.9	7.0	8.0	580.9	579.9	19,000	13.0
SB-105,10-12'	SB-105	587.9	10.0	12.0	577.9	575.9	36,000	40.0
SB-105,12-13'	SB-105	587.9	12.0	13.0	575.9	574.9	1,500	4.0

Notes:
bgs - below ground surface
MSL - feet above mean sea level
Shading indicates sample intervals
believed to be within the sediment layer

Table 1
Field Sampling Results
Slip 3 Alteration - Waukegan Harbor
Waukegan, Illinois

Sample Name	Location	Elevation (MSL)	Top of Interval (ft bgs)	Bottom of Interval (ft bgs)	Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)	% Moisture
SB-106,2.5-4.0'	SB-106	586.8	2.5	4.0	584.3	582.8	510	3.2
SB-106,5-7'	SB-106	586.8	5.0	7.0	581.8	579.8	470	3.6
SB-106,7-8.4'	SB-106	586.8	7.0	8.4	579.8	578.4	310	4.8
SB-106,10-12'	SB-106	586.8	10.0	12.0	576.8	574.8	250	6.7
SB-106,12-14'	SB-106	586.8	12.0	14.0	574.8	572.8	1,000	5.7
SB-107,2.5-4'	SB-107	588.2	2.5	4.0	585.7	584.2	5,200	5.9
SB-107,5-7'	SB-107	588.2	5.0	7.0	583.2	581.2	4,200	9.3
SB-107,7-9'	SB-107	588.2	7.0	9.0	581.2	579.2	5,800	16.0
SB-107,10-11.6'	SB-107	588.2	10.0	11.6	578.2	576.6	3,200	7.8
SB-107,11.6-13.5'	SB-107	588.2	11.6	13.5	576.6	574.7	42,000	25.0
SB-108,2.5-4.3'	SB-108	587.1	2.5	4.3	584.6	582.8	7,100	5.2
SB-108,5-7'	SB-108	587.1	5.0	7.0	582.1	580.1	590	6.0
SB-108,7-8.5'	SB-108	587.1	7.0	8.5	580.1	578.6	290	3.7
SB-108,10-12.3'	SB-108	587.1	10.0	12.3	577.1	574.8	1,200	4.3
GB-01,3'	GB-01	588.3	3	-	585.3	-	-	3.1
GB-01,7'	GB-01	588.3	7	-	581.3	-	-	41
GB-01,11'	GB-01	588.3	11	-	577.3	-	-	5.6
GB-01,15'	GB-01	588.3	15	-	573.3	-	-	44
GB-01,19'	GB-01	588.3	19	-	569.3	-	-	16
GB-01,23'	GB-01	588.3	23	-	565.3	-	-	16

Notes:
bgs - below ground surface
MSL - feet above mean sea level
Shading indicates sample intervals
believed to be within the sediment layer

Table 1
Field Sampling Results
Slip 3 Alteration - Waukegan Harbor
Waukegan, Illinois

Sample Name	Location	Elevation (MSL)	Top of Interval (ft bgs)	Bottom of Interval (ft bgs)	Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)	% Moisture
GB-02,3'	GB-02	587.9	3	-	584.9	-	-	5.3
GB-02,6'	GB-02	587.9	6	-	581.9	-	-	4.7
GB-02,11'	GB-02	587.9	11	-	576.9	-	-	7.2
GB-02,16'	GB-02	587.9	16	-	571.9	-	-	29
GB-02,20'	GB-02	587.9	20	-	567.9	-	-	45
GB-02,23'	GB-02	587.9	23	-	564.9	-	-	19
GB-03,3'	GB-03	588.9	3	-	585.9	-	-	3.5
GB-03,20'	GB-03	588.9	20	-	568.9	-	-	14

Notes:
bgs - below ground surface
MSL - feet above mean sea level
Shading indicates sample intervals
believed to be within the sediment layer

SB-101		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
586.3	585.0	16,000
583.8	581.8	25,000
581.8	579.8	5,800
578.8	576.8	3,700
576.8	575.7	5,300

SB-102		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
585.8	584.3	1,200
583.2	581.2	16,000
581.2	580.0	9,700
578.2	576.9	21,000

SB-103		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
585.3	583.8	530
582.7	580.7	1,700
579.7	577.8	900
577.7	575.7	860

SB-104		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
585.5	584.0	2,000
583.0	581.0	5,100
581.0	579.7	26,000
578.0	576.5	4,500

SB-105		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
585.7	584.2	9,700
582.9	580.9	2,100
580.9	579.9	19,000
577.9	575.9	36,000
575.9	574.9	1,500

SB-106		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
584.3	582.8	510
581.8	579.8	470
579.8	578.4	310
576.8	574.8	250
574.8	572.8	1,000

SB-107		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
585.7	584.2	5,200
583.2	581.2	4,200
581.2	579.2	5,800
578.2	576.6	3,200
576.6	574.7	42,000

SB-108		
Top of Interval (MSL)	Bottom of Interval (MSL)	Total PCB's (ug/kg)
584.6	582.8	7,000
582.1	580.1	590
580.1	578.6	290
577.1	574.8	1,200

E 1,122,000 — E 1,122,400 — E 1,122,800

N 2,077,300 — N 2,076,900

SITE ENTRANCE GATE

SEA HORSE DRIVE

CB-1 RIM EL. 582.5 — 101' - 8" PIPE — CONCRETE CURBING

CB-2 RIM EL. 582.8 — 185' - 8" PIPE

CB-3 RIM EL. 583.2

CB-4 RIM EL. 583.3

CB-5 RIM EL. 583.5 — 27' - 10" PIPE

MH-1 — MH-2 — MH-3 — MH-4 — MH-5 — MH-6

W-1 — W-2 — W-3 — W-4

P-1 — P-2 — P-3 — P-4

SB-101/GB-03A — SB-102 — GB-03B — SB-103 — GB-01 — SB-104 — SB-105 — SB-106 — GB-02 — SB-107 — SB-108

R-1 — R-2

WEST SHEET PILE — EAST SHEET PILE — OLD SLIP No. 3 SSP WALL

VEGETATION COVER

WATER TREATMENT BUILDING

GOLD BOND BUILDING PRODUCTS

UPPER HARBOR

EXISTING PIER

N

0 40 80
SCALE IN FEET

LEGEND:

- EXISTING BUILDING
- RAILROAD
- PROPERTY LINE (APPROX)
- FENCE
- SLIP No. 3 SHEET PILING
- RW — RAW WATER TO TREATMENT BUILDING
- D — TREATED WATER DRAIN TO EXISTING CATCH BASIN
- SD — STORM DRAIN
- E — ELECTRICAL
- SOIL BENTONITE WALL
- MH — MANHOLE
- CB — CATCH BASIN
- UTILITY POLE
- LIGHT POLE
- SB — SOIL BORING
- GB — GEOTECHNICAL SOIL BORING
- P — PIEZOMETER
- W — MONITORING WELL
- R — RECOVERY WELL

Notes:
- Sampling was conducted in March 2007
- MSL - feet above mean sea level
- Shading indicates sample intervals believed to be within the sediment layer

PCB SAMPLE RESULTS

PREPARED FOR

CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company
1050 Broadway, Suite 7
Chesterton, Indiana 46304
Phone: (219) 926-5508 • Fax: (219) 926-8446

DATE: 6-15-07

SCALE: AS SHOWN

FIGURE 1

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
△			HEC		

6/12/2007 ...\BASE FOR FIGS.dgn

Attachment A

Soil Boring Logs

Deigan & Associates

BORING NUMBER SB-101

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	588.75	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,194.84 East & 2,077,184.27 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Black organic silty clay, topsoil, fill, frozen. Below 1.0', brown fine sand, fill, medium dense, damp. Encountered liner at 2.5' bgs. Below 2.5', brown and gray fine sand, fill, medium dense, damp. Recovery = 47"		OL
					SP
2					
					SP
4					
			Brown, gray and black fine sand, mixed with black silty to clayey fine sand, fill, medium dense to soft, moist to wet. Occasional coarse to fine gravel layers, fill, moist. Recovery = 50"		SP
					SC
6					
					GW
8					
			As above, mostly brown, gray and black fine sand, fill, medium dense, damp. Recovery = 37"		SP
10					
12					
14					
16					
18					
20					

Collected composite soil samples for PCBs at 2.2-3.8', 5-7', 7-9', 10-12', 12-13.1' bgs
Collected duplicate composite soil sample for PCBs at 10-12' bgs.

Legend: SILTY CLAY; CLAYEY SAND; ORGANIC; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-102

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 Inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	588.19	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,194.73 East & 2,077,135.05 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 1.0', brown fine		OL
			sand, fill, medium dense, moist. Encountered liner at 2.4' bgs.		SP
			Below 2.4', gray fine sand, fill, medium dense, damp.		
2			Recovery = 47"		
					SP
4					
			As above, fill, medium dense, damp. Below 5.5', gray fine sand,		SP
			fill, mixed with black silty to clayey fine sand, soft, wet.		SC
6			Recovery = 38"		
8					
			As above, damp. Below 11.7', black silty to clayey fine sand, very		SP
10			soft, wet. Recovery = 16"		SC
12					
14					
16					
18					
20					

Collected composite soil samples for PCBs at 2.4-3.9', 5-7', 7-8.2', 10-11.3' bgs
Collected duplicate composite soil sample for PCBs at 7-8.2' bgs.
Collected field blank sample using pre-bagged clean medium grain sand, mixed in stainless bowl.

Legend					
	SILTY CLAY		Organic topsoil		SILT
	CLAYEY SAND		SAND		

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-103

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	587.72	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,332.37 East & 2,077,114.96 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 0.8', brown fine		OL
			sand, fill, medium dense, damp. Liner encountered at 2.4' bgs.		SP
			Below 2.4', brown and gray fine sand, medium dense, damp.		
2			Recovery = 47"		
					SP
4					
			As above, becoming gray fine sand, fill, medium dense, damp.		SP
			Recovery = 58"		
6					
8					
10			As above, gray fine sand, fill, medium dense, damp.		SP
			Recovery = 28"		
12					
14					
16			Collected composite soil samples for PCBs at 2.4-3.9', 5-7', 8-9.9', 10-12' bgs		
18					
20					

Legend

SILTY CLAY
CLAYEY SAND
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-104

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	588.04	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,404.90 East & 2,076,994.23 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 1.0', brown fine		OL
			sand, fill, medium dense, moist. Encountered liner at 2.5' bgs.		SP
			Below 2.5', gray fine sand, fill, medium dense, damp.		
2			Recovery = 49"		
					SP
4					
			Gray fine sand mixed with black silty to clayey fine sand, fill, soft		SP
			to medium dense, moist to wet. Recovery = 40"		SC
6					
8					
10			Gray and black fine sand, fill, medium dense, damp.		SP
			Recovery = 18"		
12					
14					
16					
			Collected composite soil samples for PCBs at 2.5-4.0', 5-7', 7-8.3', 10-11.5' bgs		
			Collected duplicate composite soil sample for PCBs at 2.5-4.0'		
18					
20					

Legend: SILTY CLAY; CLAYEY SAND; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-105

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	587.87	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,487.30 East & 2,076,986.79 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Black organic silty clay, topsoil, fill, frozen. Below 0.8', brown fine sand, fill, medium dense, damp. Encountered liner at 2.2' bgs. Below 2.2', gray fine sand, fill, medium dense, damp. Recovery = 45"		OL SP
2					SP
4			As above, becoming dark gray and black fine sand below 6.2'. Mixed with black silty to clayey fine sand, fill, soft, wet. Recovery = 36"		SP
6					SC
8					
10			Black silty to clayey fine sand, fill, soft, wet. Below 11.3', brown and gray fine sand, fill, damp. Recovery = 35"		SC
12					SP
14					
16					
18					
20					

Collected composite soil samples for PCBs at 2.2-3.7', 5-7', 7-8', 10-12', 12-13' bgs
Collected field blank using pre-bagged clean medium grain sand, mixed in stainless steel bowl.

Legend: SILTY CLAY; CLAYEY SAND; ORGANIC; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-106

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 Inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	586.82	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,580.99 East & 2,076,926.13 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 0.8', brown fine sand, fill, medium dense, moist. Encountered liner at 2.4' bgs. Below 2.4', gray fine sand, fill, medium dense, damp. Recovery = 49"		OL SP
2					
4			As above, fill, medium dense, damp. From 7.5 to 7.8', black silty to clayey fine sand, soft, wet. Recovery = 41"		SP
6					
8					SC
10			As above, gray fine sand with black silty to clayey fine sand layers, moist to wet. Below 12.7', gray silty clay, fill, mixed with gray fine sand, moist. Recovery = 47"		SP SC
12					CL SP
14					
16					
18					
20					

Collected composite soil samples for PCBs at 2.5-4.0', 5-7', 7-8.4', 10-12', 12-14' bgs
Collected duplicate composite soil sample for PCBs at 5-7' bgs

Legend

SILTY CLAY
CLAYEY SAND
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-107

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	588.18	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,496.18 East & 2,076,858.98 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 1.0', brown fine sand, fill, medium dense, moist. Encountered liner at 2.5' bgs.		OL SP
2			Below 2.5', gray fine sand, fill, medium dense, damp. Becoming gray silty fine sand below 3.4', damp to moist. Recovery = 48"		SM
4					
6			As above, fill, medium dense, damp. Recovery = 49"		SM
8					
10			As above, fill, medium dense, damp to moist. Below 11.6', black silty to clayey fine sand, fill, medium dense, wet. Recovery = 49"		SM SC
12					
14					
16					
18					
20					

Collected composite soil samples for PCBs at 2.5-4.0', 5-7', 7-9', 10-11.6', 11.6-13.5' bgs

Legend: SILTY CLAY; CLAYEY SAND; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SB-108

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	15 ft.	DEPTH TO WATER	
GROUND ELEV.	587.07	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 5, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,525.49 East & 2,076,732.03 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 0.7', brown fine sand, fill, medium dense, damp. Liner encountered at 2.4' bgs. Below 2.4', gray fine sand, medium dense, damp. Recovery = 52"		OL SP
2					SP
4			As above, with trace medium to fine sand, fill, medium dense, damp. Recovery = 42"		SP
6					
8					
10			As above, light gray to tan fine sand, fill, medium dense, damp. Recovery = 28"		SP
12					
14					
16			Collected composite soil samples for PCBs at 2.5-4.3', 5-7', 7-8.5', 10-12.3' bgs		
18					
20					

Legend

SILTY CLAY | CLAYEY SAND | Organic topsoil | SAND | SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-01

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 Inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	588.32	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,346.38 East & 2,077,030.92 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0					
			Black organic silty clay, topsoil, fill, frozen. Below 1.0', brown fine		OL
			sand, fill, medium dense, moist. Encountered liner at 2.7' bgs.		SP
			Below 2.7', brown fine sand, fill, medium dense, damp. Below 4.2',		
2			gray fine sand, fill, medium dense, damp. Recovery = 54"		
					SP
4					SP
			Gray fine sand mixed with black silty to clayey fine sand, fill,		SP
			medium dense to soft, damp to wet. Becoming mostly black silty		SC
6			to clayey fine sand below 7.2', soft, wet. Recovery = 41"		
					SC
8					
			Black silty to clayey fine sand, fill, soft, wet. Below 10.3', gray fine		SC
10			sand, fill, medium dense, damp. Recovery = 44"		SP
12					
14					
			Gray fine sand mixed with black silty to clayey fine sand, fill,		SP
			medium dense to soft, moist to wet. Below 17.1', gray fine sand,		SC
16			natural, medium dense, saturated.		
					SP
18					
20					

Legend: SILTY CLAY; CLAYEY SAND; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-01 (CONT.)

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	588.32	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,346.38 East & 2,077,030.92 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Gray medium to fine sand, medium dense, saturated. Per driller, encountered silty clay till around 24' bgs. Recovery = 48"		OL
2					SP
4					CL
6			Encountered approximately 4' of sand blow-in within dual wall. Unable to advance to 25' sample depth.		
8			Collected geotechnical soil samples for grain size distribution & hydrometer at 6-7' & 18-19' bgs. Collected geotechnical soil samples for moisture content at 3',7',11',15',19',23' bgs.		
10					
12					
14					
16					
18					
20					

Legend: SILTY CLAY; CLAYEY SAND; ORGANIC; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-02

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	587.92	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,538.95 East & 2,076,881.56 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0					
			Black organic silty clay, topsoil, fill, frozen. Below 1.1', brown fine sand, fill, medium dense, moist. Encountered liner at 2.2' bgs.		OL SP
2			Below 2.2', brown fine sand, fill, medium dense, damp. Below 2.8', gray medium to fine sand mixed with black silty fine sand, fill, medium dense, damp.		
					SM
4					
			Gray fine sand, fill, medium dense, damp. Recovery = 53"		SP
6					
8					
10			As above, gray fine sand, fill, medium dense, damp. Recovery = 29"		SP
12					
14					
			Black silty to clayey fine sand, fill, soft, wet. Recovery = 60"		SC
16					
18					
20					

Legend: SILTY CLAY; CLAYEY SAND; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-02 (CONT.)

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	587.92	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,538.95 East & 2,076,881.56 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Gray medium to fine sand, fill, damp. Black silty to clayey fine sand from 22.2 to 23.1' bgs, soft, saturated. Recovery = 55"		SP
2					SC
4					
6			Encountered approximately 8' of sand blow-in within dual wall. Unable to advance to 25' sample depth.		
8			Collected geotechnical soil samples for grain size distribution & hydrometer at 5-6' & 18-19' bgs. Collected geotechnical soil samples for moisture content at 3',6',11',16',20',23' bgs.		
10					
12					
14					
16					
18					
20					

Legend

SILTY CLAY
CLAYEY SAND
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-03

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	588.89	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,254.31 East & 2,077,133.89 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Black organic silty clay, topsoil, fill, frozen. Below 1.1', brown fine sand, fill, medium dense, moist. Encountered liner at 2.5' bgs. Below 2.5', brown fine sand, fill, medium dense, damp. Below 3.7', light gray fine sand, fill, medium dense, damp. Recovery = 49"		OL SP
2					
4			Gray fine sand, fill, loose, damp. Poor recovery. Recovery = 3"		SP
6					
8					
10			As above, gray fine sand, fill, loose. Poor recovery. Recovery = 4"		SP
12					
14			As above, gray fine sand, fill, loose. Poor recovery. Recovery = 3"		SP
16					
18					
20					

Legend: SILTY CLAY; CLAYEY SAND; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER GB-03 (CONT.)

PROJECT	Waukegan Harbor, Slip 3	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	3 inches
TOTAL DEPTH	25 ft.	DEPTH TO WATER	
GROUND ELEV.	588.89	DRILLING METHOD	Geoprobe w/ Dual Wall
COMPANY	Cabeno Environmental Services	DATE DRILLED	March 6, 2007
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	1,122,254.31 East & 2,077,133.89 North		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample USCS
0			Gray and black fine sand, fill, dense, saturated. Per driller, encountered silty clay till at approximately 22' bgs. Recovery = 18"		SP
2					CL
4					
6					
8			Collected geotechnical soil samples for grain size distribution & hydrometer at 3-4' & 20-21' bgs. Collected geotechnical soil samples for moisture content at 3',20' bgs.		
10					
12					
14					
16					
18					
20					

Legend

SILTY CLAY
CLAYEY SAND
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Attachment B

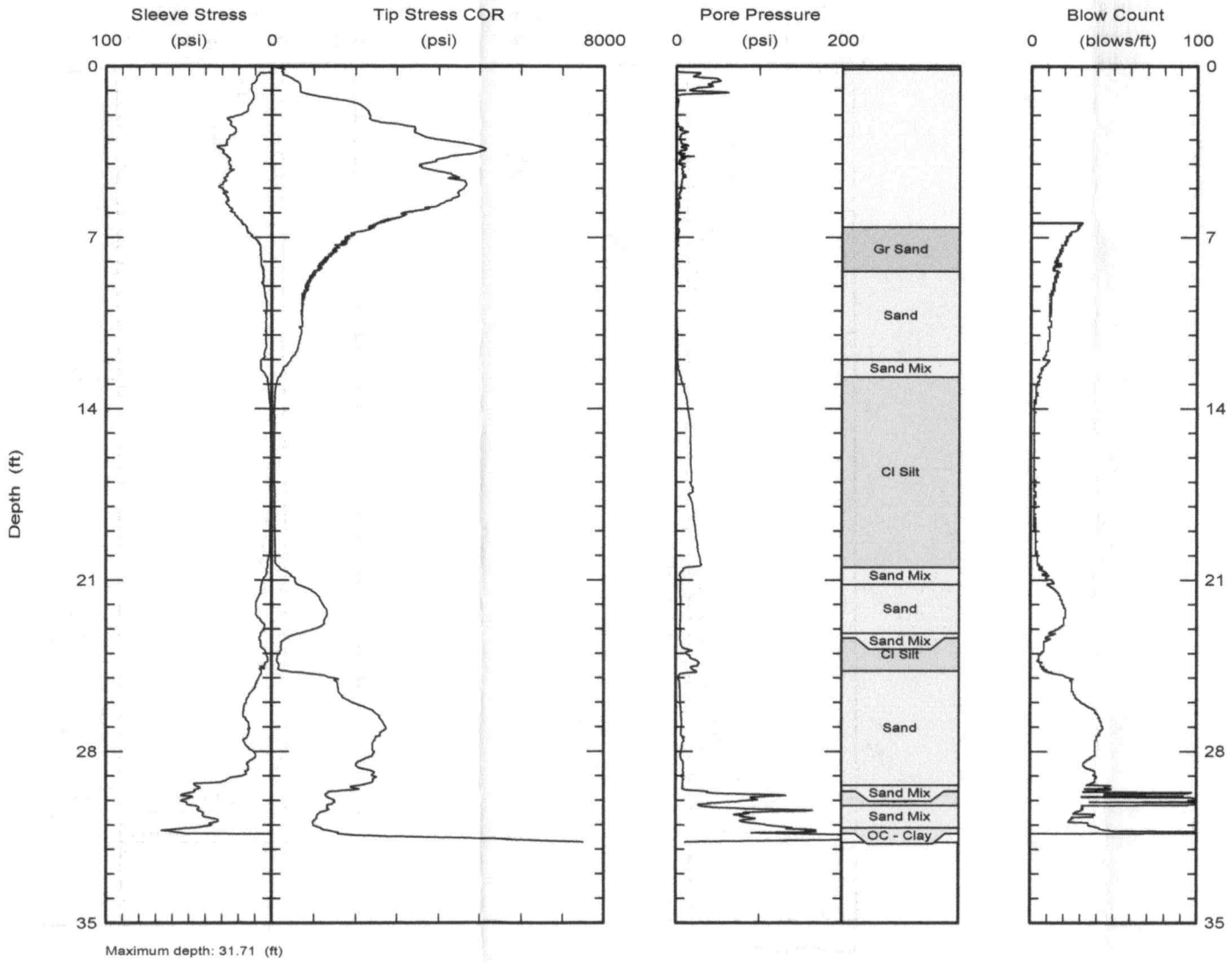
Cone Penetrometer Soundings

CABENO Environmental Field Services
Crest Hill, IL 60435
815-372-1702
Email: jneil14@attbi.com

Northing:
Easting:
Elevation:

Date: 05/Mar/2007
Test ID: CPT1
Project: Slip3

Client: Hard Hat, Inc.
Site: Larsen Marine



Maximum depth: 31.71 (ft)

Test ID: CPT1
File: A05M0701C.ECP

Electric Cone Penetrometer Data
Cone_TAP v 2.81

Test Id:	CPT1		Date:	5-Mar-07
Site:	Larsen Marine		Cone	Id: 2197.101XX
Location:	Waukegan			
Project:	Slip3	S	oil Density(pcf):	120
Client:	Hard Hat, Inc.			

Depth (ft)	Sleeve Stress (psi)	Tip Stress UNC (psi)	Tip Stress COR (psi)	Ratio COR (%)	Pore Pressure (psi)	Blow Count (blows/ft)	Friction Angle (deg)	Su (psi)
0.00	0	0	0	0	0	-99	0	0
0.51	9.18	469.5	478.5	1.92	46.7	-99	-99	31.27
1.00	12.13	670.8	674	1.8	16.56	-99	-99	44.66
1.50	12.55	1974.9	1975.3	0.64	2.04	-99	-99	131.58
2.00	19.45	2334	2334.1	0.83	0.65	-99	-99	155.49
2.50	22.79	3427.2	3428.1	0.66	4.55	-99	-99	228.34
3.00	26.7	3944	3944.9	0.68	4.55	-99	-99	262.77
3.50	28.99	5006.7	5007.6	0.58	4.83	-99	-99	333.58
4.00	25.81	3601.2	3601.9	0.72	3.92	-99	-99	239.86
4.50	26.83	4411.4	4412.8	0.61	7.23	-99	-99	293.84
5.01	29.46	4608.3	4609.2	0.64	4.66	-99	-99	306.94
5.50	26.05	4264.5	4264.8	0.61	1.35	-99	-99	284
6.01	22.47	3163.8	3164.2	0.71	1.82	-99	-99	210.59
6.50	15.98	2479.5	2479.9	0.64	1.82	30	50.94	-99
7.00	11.37	1740.3	1740.8	0.65	2.47	21	49.27	-99
7.50	6.78	1516.5	1516.6	0.45	0.82	18	48.43	-99
8.00	6.41	1197.3	1197.5	0.54	1.01	14	47.14	-99
8.50	5	1002.9	1003.1	0.5	1.2	16	46.08	-99
9.00	4.83	797.1	797.3	0.61	0.96	13	44.75	-99
9.50	3.76	722.5	722.7	0.52	0.96	12	44.01	-99
10.01	3.43	727.4	727.6	0.47	0.96	12	43.79	-99
10.50	3.51	730.7	730.9	0.48	1.06	12	43.58	-99
11.00	3.52	690.7	691	0.51	1.64	11	43.06	-99
11.51	3.35	617.3	617.6	0.54	1.54	10	42.25	-99
12.00	5.94	451.1	451.4	1.31	1.59	7	40.36	-99
12.50	4.95	240.9	241.7	2.05	4.18	6	36.48	15.37
13.01	2.07	104.1	105.6	1.96	7.9	4	30.73	6.21
13.51	1.58	73.1	75.4	2.1	12.13	3	27.92	4.12
14.00	0.9	60.1	62.8	1.44	14.16	2	26.18	3.23
14.51	0.81	63.1	66.3	1.22	16.36	2	26.28	3.4
15.00	0.6	59.8	63.1	0.96	17.12	2	25.62	3.15
15.50	0.62	56.6	59.9	1.03	17.45	2	24.93	2.91
16.00	0.59	59.8	63.2	0.93	17.68	2	25.12	3.1
16.50	0.6	56.6	60	0.99	18.01	2	24.44	2.85
17.00	0.74	64.7	68.2	1.08	18.2	2	25.26	3.37

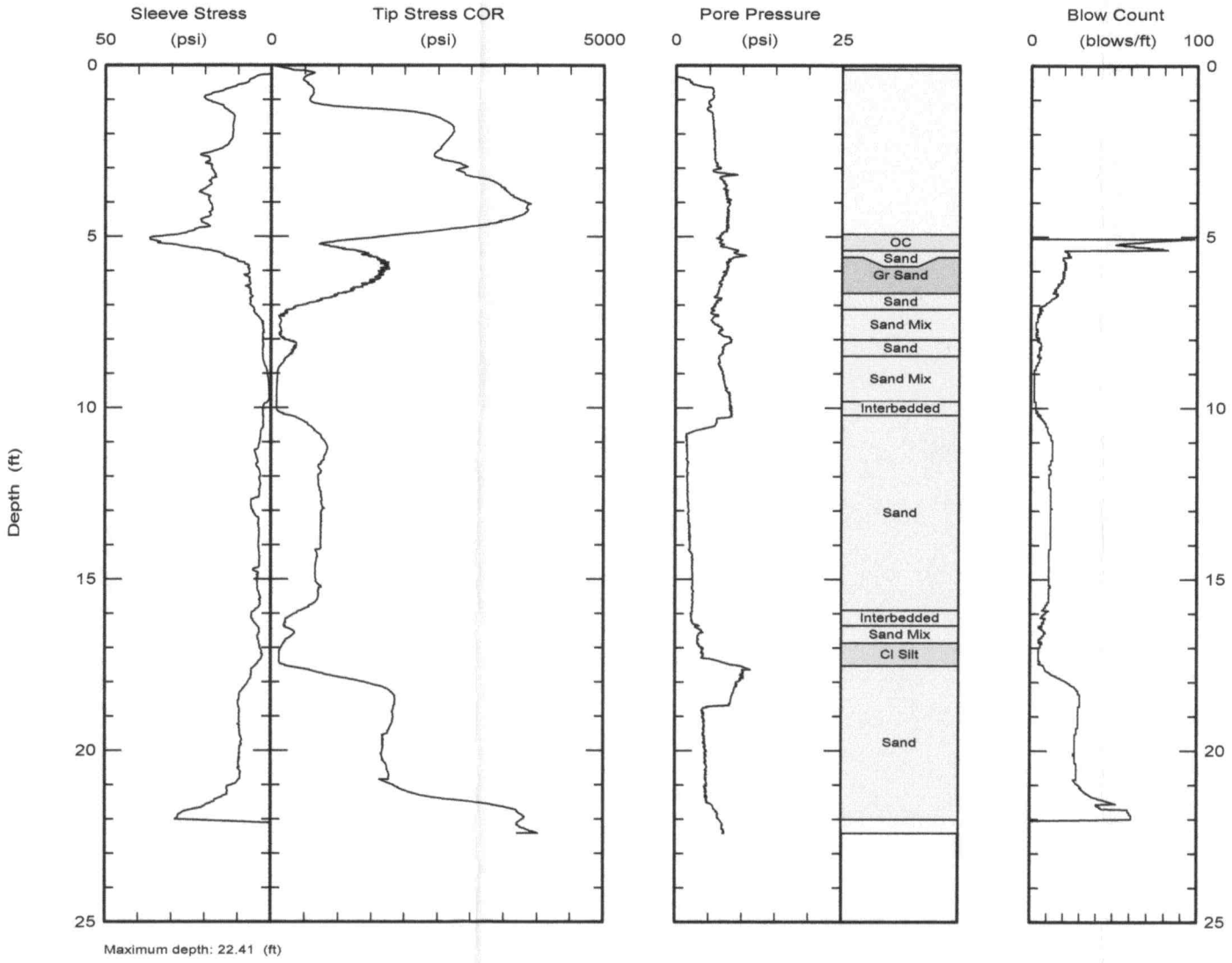
17.50	0.81	75.3	78.2	1.03	14.88	3	26.2	4.05
18.01	0.75	67.1	71.1	1.05	20.31	2	25.1	3.48
18.50	0.8	67.1	71.2	1.12	21.2	2	24.89	3.45
19.01	0.91	68.8	73.3	1.24	23.52	2	24.86	3.53
19.50	1.01	76.9	81.9	1.24	25.69	3	25.54	4.05
20.00	1.33	78.6	84	1.58	27.95	4	-99	4.13
20.50	2.62	201	203.1	1.29	10.78	5	32.13	12.26
21.00	5.26	551.2	552.3	0.95	5.99	13	38.32	35.58
21.51	6.55	1020	1021.1	0.64	5.75	16	41.61	-99
22.00	9.42	1221.6	1222.7	0.77	5.94	20	42.43	-99
22.50	8.6	1293.7	1294.8	0.66	5.7	21	42.61	-99
23.00	4.17	1016.7	1017.7	0.41	5.28	16	41.23	-99
23.50	6.55	249.6	250.8	2.61	6.27	9	32.67	15.33
24.01	3.31	172.6	174.9	1.89	12.1	6	29.97	10.17
24.50	4.34	171.8	176.9	2.46	26.44	6	29.8	10.09
25.01	7.7	1502.4	1503.2	0.51	4.24	24	42.83	-99
25.50	11.16	1590.7	1591.7	0.7	5.47	25	43.03	-99
26.00	15.33	1917.6	1918.7	0.8	5.51	31	43.86	-99
26.50	17.04	2540.4	2541.7	0.67	6.5	41	45.12	-99
27.00	13.47	2734.9	2736.3	0.49	7.21	44	45.38	-99
27.51	16.38	2475	2476.8	0.66	9.43	40	44.82	-99
28.00	10.5	2453.8	2455	0.43	6.36	39	44.7	-99
28.51	14.75	2009.1	2010.9	0.73	9.1	32	43.64	-99
29.01	18.53	2432.5	2433.9	0.76	7.31	39	44.48	-99
30.00	54.21	1471.3	1489	3.64	91.23	106	41.79	-99
30.51	41.15	1133	1148.7	3.58	81.79	27	40.29	73.84
31.00	36.05	966.2	987	3.65	107.34	35	39.31	62.69
31.51	0	3737.1	3796.8	0	309.25	-99	-99	247.39
31.71	0	7503.6	7505.8	0	11.33	-99	-99	498.48

CABENO Environmental Field Services
Crest Hill, IL 60435
815-372-1702
Email: jneil14@attbi.com

Northing:
Easting:
Elevation:

Date: 05/Mar/2007
Test ID: CPT2
Project: Slip3

Client: Hard Hat, Inc.
Site: Larsen Marine



Maximum depth: 22.41 (ft)

Electric Cone Penetrometer Data
Cone_TAP v 2.81

Test Id:	CPT2		Date:	5-Mar-07
Site:	Larsen Marine		Cone ID:	2197.101XX
Location:	Waukegan			
Project:	Slip3	S	oil Density(pcf	20
Client:	Hard Hat, Inc.			

Depth (ft)	Sleeve Stress (psi)	Tip Stress UNC (psi)	Tip Stress COR (psi)	Ratio COR (%)	Pore Pressure (psi)	Blow Count (blows/ft)	Friction Angle (deg)	Su (psi)
0.00	0	0	0	0	0	-99	0	0
0.51	7.4	545.7	546.1	1.35	2.34	-99	-99	36.35
1.00	19.58	570	571	3.43	5.34	-99	-99	37.95
1.50	11.01	2469	2470	0.45	5.43	-99	-99	164.51
2.01	11.65	2710.8	2711.9	0.43	5.62	-99	-99	180.61
2.50	17	2495	2496.1	0.68	5.71	-99	-99	166.19
3.00	18.06	2869.9	2871.2	0.63	6.74	-99	-99	191.16
4.00	18.43	3812.9	3814.3	0.48	7.59	-99	-99	253.97
4.50	21.27	3582.4	3583.9	0.59	7.57	-99	-99	238.58
5.01	34.61	1639.2	1640.4	2.11	6.58	118	50.36	-99
5.50	15.13	1454.1	1455.8	1.04	8.93	23	49.52	-99
6.00	6.66	1655.4	1656.9	0.4	7.61	20	49.69	-99
6.50	6.58	1218.7	1219.9	0.54	6.44	15	48.11	-99
7.01	6.11	480	481.2	1.27	5.93	8	43.5	-99
7.51	2.46	143.9	145	1.7	5.52	3	36.45	9.18
8.00	2.34	205.7	207.3	1.13	8.2	5	38.21	13.27
8.50	2.47	261	262.2	0.94	6.46	4	39.23	-99
9.00	0.92	96.8	98.1	0.94	6.98	2	32.75	5.95
9.50	0.62	85.4	86.9	0.72	7.59	2	31.54	5.17
10.01	2.27	87	88.6	2.56	8.39	3	31.3	5.25
10.50	2.31	556.9	558	0.41	5.94	9	42.19	-99
11.00	3.46	805.9	806.2	0.43	1.71	13	43.83	-99
11.50	4.04	788	788.3	0.51	1.71	13	43.5	-99
12.00	3.18	700.1	700.4	0.45	1.75	11	42.69	-99
12.51	3.43	742.4	742.7	0.46	1.75	12	42.77	-99
13.00	5.28	753.8	754.2	0.7	2.04	12	42.65	-99
13.50	3.61	739.1	739.5	0.49	2.08	12	42.36	-99
14.01	3.74	739.1	739.6	0.51	2.27	12	42.17	-99
14.51	3.44	671.5	671.9	0.51	2.52	11	41.48	-99
15.00	4.02	666.6	667	0.6	2.52	11	41.26	-99
15.50	3.28	707.3	707.8	0.46	2.61	11	41.4	-99
16.01	5.74	356.7	357.1	1.61	2.33	9	37.36	22.89
16.50	3.47	324	324.8	1.07	3.84	8	36.6	20.69

17.01	3.23	151.2	152	2.13	4.21	5	31.46	9.13
17.50	4.38	182.1	183.8	2.38	8.31	7	32.53	11.17
18.01	6.95	1390.3	1392.1	0.5	9.16	22	44.08	-99
18.51	9.54	1857.6	1859.2	0.51	8.36	30	45.34	-99
19.00	9.44	1834.7	1835.5	0.51	4.16	29	45.15	-99
19.50	9.34	1759.6	1760.4	0.53	4.25	28	44.84	-99
20.00	9.35	1671.3	1672.2	0.56	4.68	27	44.47	-99
20.50	9.42	1740	1740.9	0.54	4.72	28	44.54	-99
21.00	11.74	1836.8	1837.7	0.64	4.7	29	44.69	-99
21.50	17.37	3011.2	3012.1	0.58	4.75	48	46.85	-99
22.00	28.44	3793.6	3794.9	0.75	6.59	61	47.76	-99
22.40	0	3992.9	3994.3	0	7.39	-99	-99	264.95

Attachment C
Photographic Log

Photo 1 – CPT soil investigation at the GB-02 location.

Photo 2 – Close-up view of CPT investigative tooling and equipment.

Photo 3 – Evaluation of CPT data (left) at the GB-02 location.

Photo 4 –CPT investigative work at the GB-01 location.

Photo 5 – View of Geoprobe soil investigation at SB-105 location.

Photo 6 – Soil samples; bottom sample showing liner at approximately 2.4 feet deep.

Photo 7 – Soil probe sampling at SP-06 location.

Photo 8 – Decontamination of Geoprobe sampling equipment with methanol (10%).

Photo 9 – Soil samples extending to 25 feet deep (1st core on top, 5th core on bottom).

Photo 10 – Blow-in sands inside the outer casing at GB-02 location.

Photo 11 – Laboratory bottles used for soil samples. Sand used for field blanks (left).

Photo 12 – Close up view of clean (bagged) sand used for QA/QC field blank samples.

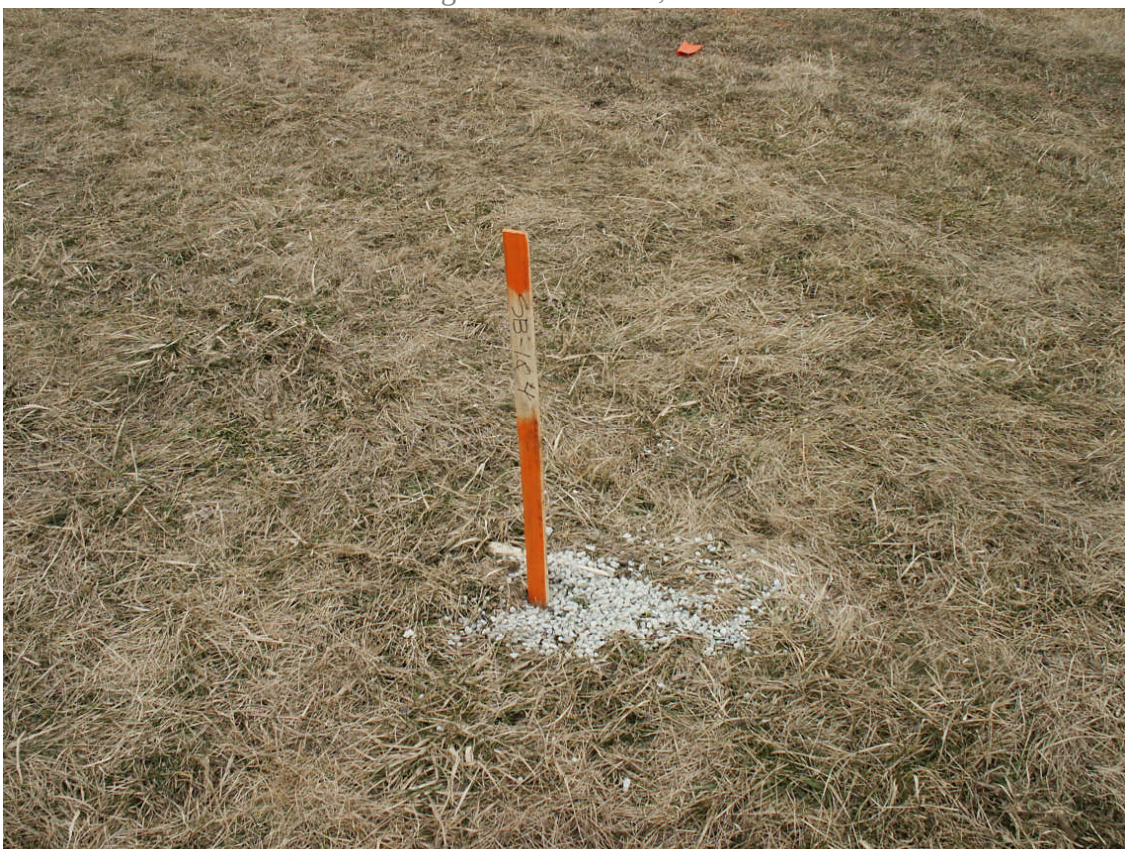


Photo 13 – Survey stake at typical boring location. Bentonite pellets used for backfill.

Photo 14 – View of 55-gallon drums used for containerizing soil and water wastes.

Attachment D

STL Analytical Reports